

REGIONAL LAND USE PLANNING BASED ON REMOTE SENSING DATA

Kurkdjian, M.L.N.O.; Valério Filho, M.; Veneziani, P.; Anjos, C.E.; Pereira, M.N.; Florenzano, T.G.; Sausen, T.M.; Ohara, T.

Federative Republic of Brazil
Secretariat of Science and Technology
Brazilian Institute for Space Research

ABSTRACT

The regional land use planning of Paraíba Valley and the North Coast of São Paulo State - Brazil, was done using mainly orbital remote sensing data. The area of this region is of approximately 18.000 km². Emphasis was given on photointerpretation of satellite images to produce geological, geomorphological, ground water and land use maps. Geological engineering and agricultural land use suitability maps were elaborated integrating different maps. All of them were presented at the scale of 1:250,000. In order to have a comprehensive approach of the region, socioeconomic data and official information related to environmental protected areas, as well as mining activities in the region were considered. Finally, economical alternatives were proposed and different land use arrangements were indicated to promote the self-sustainable regional development.

KEY WORDS: Regional Planning, Remote Sensing, Regional land use Planning.

1. INTRODUCTION

This work was done aiming on two main objectives: a) to provide useful information to CODIVAP (Consórcio de Desenvolvimento Integrado do Vale do Paraíba e Litoral Norte - Integrated Development of Paraíba Valley and North Coast Partnership) by supporting the elaboration of regional land use directives; b) to offer the Brazilian technical scientific community a methodology for regional planning based on multi-sources data, with emphasis on the use of orbital remote sensing data.

The study area is shown in Figure 1.1. It is of approximately 18.000 km² and is located between the cities of São Paulo and Rio de Janeiro, in one of the most industrialized areas of the country.

The region is composed by the municipalities of São Paulo State inside the watersheds of Paraíba do Sul River, Sapucaí Mirim River and the North Coast. It is also composed by the municipalities of Salesópolis and Biritiba Mirim in the watershed of the Tiete River.

2. METHODOLOGY

According to the diversity of specific objectives, TM/Landsat and HRV/SPOT images were interpreted. During the interpretation process the multispectral, multitemporal, synoptic and ground resolution characteristics of the orbital data were explored. Visual interpretation or image processing were performed

according to different purposes, using one among different scales of representation (from 1:250.000 to 1:50.000).

The final products of the image interpretation process were thematic maps presented at the scale of 1:250.000, which was considered an adequate one for regional planning finalities. In some cases these maps were produced by integrating image data with cartographic ones.

The geological, geomorphological, drainage network, geological structural lineaments and ground water maps were generated as thematic maps.

Integrating thematic information two maps were elaborated: (a) geological engineering and (b) agricultural land use suitability.

The content of both documents synthetises the suitability of the land for different types of use.

The land use and vegetation cover map of the region was also elaborated based on visual image interpretation. Comparing this map with an older one from 1977 it was possible to analyze the changes of use occurred since then.

Emphasis was given on the study of the urban growth and on town network changes, as well as on the vegetation cover on the coast region.

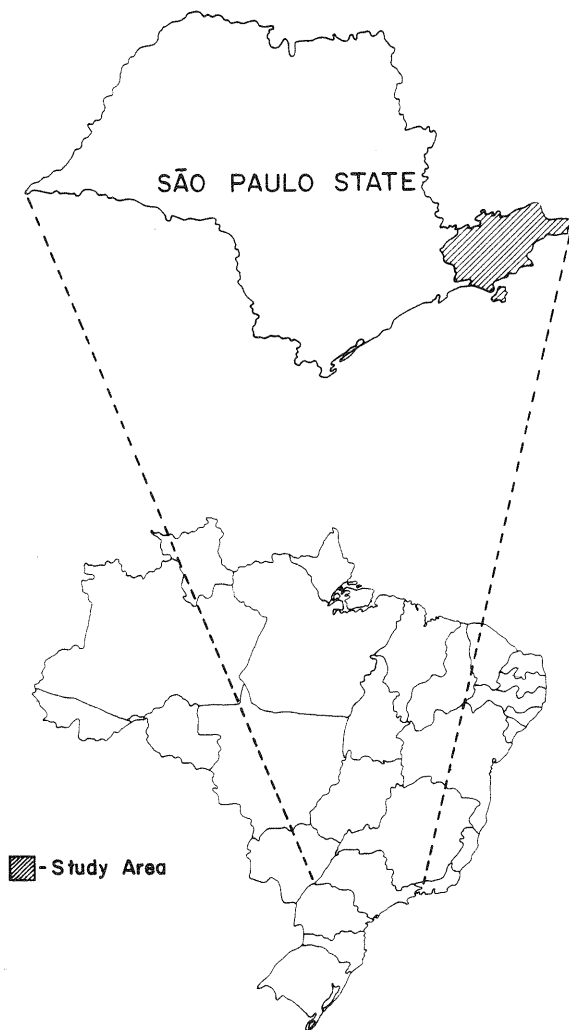


Fig. 1 - Study Area.

Comparing the land use and land cover information with information about land use suitability for different uses, some undesirable discrepancies were identified. Those discrepancies would be corrected later.

During the regional planning process, socioeconomic data and official information related to environmental protected areas as well as mining activities in the region were also analyzed, aiming a comprehensive approach of the region.

Finally an alternative of land use rearrangement was elaborated to promote a self sustainable development and more equally distribution of regional development.

3. RESULTS

The results of this project may be classified as inicial, intermediate and final products.

In the first group the products are the specific results obtained at special areas of knowledge. In the second one they are those information obtained from partial integration of previous

ones. The final product of the project is the macrozoning land use map of the region and a written statement complementary to it.

The macrozoning map indicates areas for the following uses:

- a) urban and industrial expansion,
- b) temporary and permanent cultures,
- c) fruitcultural,
- d) rubber plantations,
- e) cultivated pasture,
- f) grassland,
- g) protected areas.

A set of guidelines complementary to this map, which indicates specific uses for mapping units, was formulated. The purpose of it was to make clear that the main objective was to permit a regional self-sustainable development to the region. These guidelines are related to promoting:

- . a better use of natural and human resources;
- . a more balanced economic development, through the improvement of productive potentiality of underdeveloped municipalities, as well as through the decentralization of urban and industrial expansion.
- . the use of the more productive areas for food production.
- . the creation of new areas to be protected.

4. CONCLUSIONS

The orbital images proved to be an extremely useful source of data for the purpose of regional land use planning process.

Due to their multispectral, multitemporal and synoptic characteristics, the orbital data was a very important tool for the thematic studies which gave content to the comprehensive and integrated synthesis elaborated about the region.

Besides being an important source of useful data to support the decision making process related to the regional land use planning, the orbital images were considered an useful tool for improving the technical communication among the specialists involved in this process.

5. REFERENCES

- Kurkdjian, M.L.N.O.; Valério Filho, M.; Veneziani, P.; Pereira, M.N.; Florenzano, T.G.; Anjos, C.E.; Ohara, T.; Donzeli, P.L.; Abdon, M.N.; Sausen, T.M.; Pinto, S.A.F.; Bertoldo, M.A.; Blanco, J.G.; Czorda, S.M. Macrozoneamento da Região do Vale do Paraíba e Litoral Norte do Estado de São Paulo. São José dos Campos, INPE, 1992. 176 p. (INPE-5381-PRP/165).